1. Record Nr. UNINA9910450987003321

Autore	Tan W. Y. <1934->
Titolo	Stochastic models with applications to genetics, cancers, AIDS and other biomedical systems [[electronic resource] /] / Tan Wai-Yuan
Pubbl/distr/stampa	Singapore ; ; River Edge, N.J., : World Scientific, c2002
ISBN	981-277-796-2
Descrizione fisica	1 online resource (458 p.)
Collana	Series on concrete and applicable mathematics ; ; v. 4
Disciplina	519.2302457 610.15118 610/.1/5118
Soggetti	Medicine - Mathematical models Stochastic processes Genetics - Mathematical models AIDS (Disease) - Mathematical models Cancer - Mathematical models Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents ; Preface ; 1 Introduction ; 1.1. Some Basic Concepts of Stochastic Processes and Examples ; 1.2. Markovian and Non-Markovian Processes Markov Chains and Examples ; 1.3. Diffusion Processes and Examples ; 1.4. State Space Models and Hidden Markov Models 1.5. The Scope of the Book 1.6. Complements and Exercises ; References ; 2 Discrete Time Markov Chain Models in Genetics and Biomedical Systems ; 2.1. Examples from Genetics and AIDS ; 2.2. The Transition Probabilities and Computation 2.3. The Structure and Decomposition of Markov Chains 2.4. Classification of States and the Dynamic Behavior of Markov Chains ; 2.5. The Absorption Probabilities of Transient States ; 2.5.1. The case when CT is finite ; 2.5.2. The case when CT is infinite

2.6. The Moments of First Absorption Times
2.6.1. The case when CT is finite ; 2.7. Some Illustrative Examples ; 2.8. Finite Markov Chains ; 2.8.1. The canonical form of transition matrix ; 2.8.2. Absorption probabilities of transient states in finite Markov chains
2.9. Stochastic Difference Equation for Markov Chains With Discrete Time 2.9.1. Stochastic difference equations for finite Markov chains
; 2.9.2. Markov chains in the HIV epidemic in homosexual or IV drug user populations
; 2.10. Complements and Exercises ; 2.11. Appendix
2.11.1. The Hardy-Weinberg law in population genetics

Sommario/riassunto

This book presents a systematic treatment of Markov chains, diffusion processes and state space models, as well as alternative approaches to Markov chains through stochastic difference equations and stochastic differential equations. It illustrates how these processes and approaches are applied to many problems in genetics, carcinogenesis, AIDS epidemiology and other biomedical systems. One feature of the book is that it describes the basic MCMC (Markov chain and Monte Carlo) procedures and illustrates how to use the Gibbs sampling method and the multilevel Gibbs sampling method to solve man